DISCOVER
LET'S MAKE A DIFFERENCE

**Tech Focus – Rail**

# GRM Engineers Week 2015

GRM's Rail Division has over a decade of experience within the design, development and analysis of rail structures. First working on the development of a composite rail coach roof in 2000, projects have recently focussed on the development of train seats to meet the latest injury standards. GRM's models are fully calibrated to multiple impact tests, with most of the methods drawn from extensive experience in the Automotive industry. The GRM team have developed an unrivalled understanding of the impact performance in train structures. Rail projects delivered by the GRM team include:

1. Composite Coach Roof development for impact
2. EN 15227 – development of front end structures
3. GM/RT 2100 Issue 3 – Rail Seat development
4. GM/RT 2100 Issue 5 – Development of two rail seats with design responsibility

Watch the video of the AT 200 Train Launch Here.

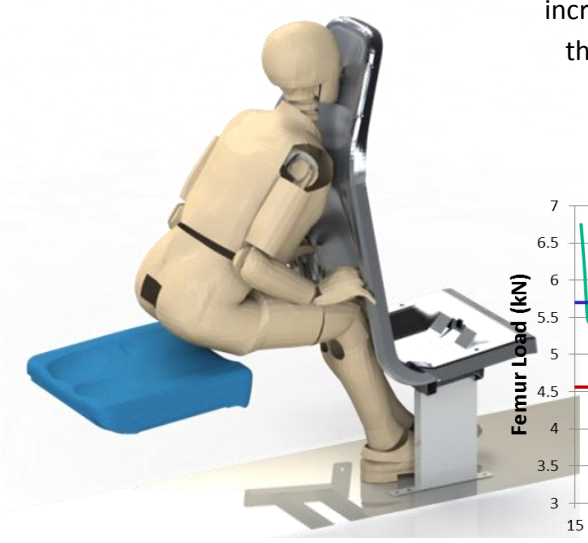
## Developing to meet new GM/RT 2100 Issue 5 Safety Regulations

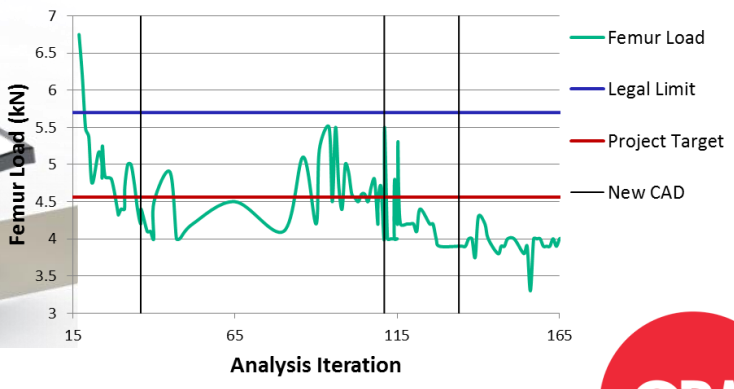
Introduced in 2013, Issue 5 of the GM/RT regulations presented significantly more challenging injury criteria to rail seat manufacturers, many of which believing the regulations may not be practical to achieve. Supporting the design and development of two rail seat programmes for seat manufacturer, Quantum Seating, GRM utilised its extensive experience of occupant simulation techniques to deliver new designs compliant with the new safety standards.

Developed entirely through simulation techniques both seat designs, M100 and H-Series, passed the injury and integrity criteria in their first physical tests. Further to this, GRM utilised design optimisation techniques available in their software product range of VR&D Genesis and GRM TruForm SW to achieve seat weights of 26kg for a floor-mounted design and 33kg for a cantilever, wall-mounted design. Compared to competitor seats these weights provide typical weight savings of approximately 25-30%; achieving over half a ton per carriage.

Safety Simulations - The figure below demonstrates an example occupant simulation used to predict the injury criteria achieved for the M100 seat design during a GM/RT 2100 Issue 5 injury test. Performing over 150 simulations during the development programme, GRM were able to incrementally improve the injury performance throughout the design process, whilst maintaining a lightweight, manufacturable design.

Contact GRM for further information.






GRM OPTIMISED ENGINEERING DESIGN